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[Designation of Document] SPECIFICATION

[Title of the Invention] HEAD DRIVE APPARATUS AND METHOD FOR INKJET PRINTER

[Claims]

[Claim 1] In a head drive apparatus, for an inkjet printer, in which a piezoelectric element, for pressurizing ink, provided to correspond to each of plural nozzles is selectively driven with a predetermined print timing by a drive signal from a head drive circuit, thus ejecting an ink droplet through the corresponding nozzle to perform printing, the head drive apparatus for an inkjet printer is characterized by comprising

a bias power supply circuit for applying a predetermined bias voltage to a ground-side electrode of each piezoelectric element, and in that

said bias power supply circuit generates the bias voltage utilizing a head drive power supply.

[Claim 2] A head drive apparatus for an inkjet printer according to claim 1, characterized in that said bias power supply circuit includes a capacitor connected to the ground-side electrode of each piezoelectric element and a constant voltage circuit for applying the bias voltage to said capacitor utilizing the head drive power supply.

[Claim 3] A head drive apparatus for an inkjet printer according to claim 2, characterized in that

said constant voltage circuit includes a Zener diode connected to the head drive power supply via a current limiting resistor, and

the voltage of the Zener diode is applied as the bias voltage to the capacitor via a coupling element.

[Claim 4] A head drive apparatus for an inkjet printer according to claim 2, characterized in that said constant voltage circuit includes a discharging diode connected in parallel to the current limiting resistor so as to cause a current to flow to the head drive power supply side.

[Claim 5] In a head drive method, for an inkjet printer, in which a piezoelectric element, for pressurizing ink, provided to correspond to each of plural nozzles is selectively driven with a predetermined print timing by a drive signal from a head drive circuit, thus ejecting an ink droplet through the corresponding nozzle to perform printing, the head drive method for an inkjet printer is characterized by comprising

a bias power supply circuit for generating the bias voltage utilizing a head drive power supply applies a predetermined bias voltage to a ground-side electrode of each piezoelectric element.

[Claim 6] A head drive method for an inkjet printer according to claim 5, characterized in that said bias power supply circuit includes a capacitor connected to the ground-side electrode of each piezoelectric element and a constant voltage circuit for applying the bias voltage to said capacitor utilizing the head drive power supply.

[Claim 7] A head drive method for an inkjet printer according to claim 6, characterized in that

said constant voltage circuit includes a Zener diode connected to the head drive power supply via a current limiting resistor, and

the voltage of the Zener diode is applied as the bias voltage to the capacitor via a coupling element.

[Claim 8] A head drive method for an inkjet printer according to claim

7, characterized in that said constant voltage circuit includes a discharging diode connected in parallel to the current limiting resistor so as to cause a current to flow to the head drive power supply side.

[Detailed Description of the Invention]

[0001]

[Technical Field to which the Invention Belongs]

The present invention relates to a head drive technique, for an inkjet printer, configured to reduce discharge of piezoelectric elements provided to correspond to nozzles for ejecting ink droplets through a head of an inkjet printer.

[0002]

[Prior Art]

Conventionally, an inkjet color printer of the type in which inks of several colors are ejected from a printhead has prevailed as an output apparatus of a computer and has been widely used to print an image processed by the computer or the like in multiple colors and tones.

[0003]

For example, an inkjet printer using a piezoelectric element as a drive element for ejecting ink is configured as follows. Plural piezoelectric elements provided to correspond to plural nozzles of a printhead are selectively driven. Thereby, ink droplets are ejected through the nozzles based on the dynamic pressure of the individual piezoelectric elements and adhered to print paper. Thereby, dots are formed on the print paper, thus performing printing.

[0004]

Here, each piezoelectric element, provided to correspond to each

nozzle for ejecting an ink droplet, is driven by a drive signal supplied from a driver IC (head drive circuit) mounted in the printhead, thus ejecting an ink droplet.

[0005]

In the meantime, in such a piezoelectric element, during non-drive (i.e. when printing is not performed), electric charge stored by charging is discharged due to insulation resistance and the voltage of the piezoelectric element is lowered, thereby affecting the ink ejection in some cases.

[0006]

Consequently, Japanese Patent No. 3097155 obtained by the present inventor discloses a head drive apparatus and method configured such that a charge voltage is applied to the piezoelectric element with a different timing from the drive timing, thus maintaining the charge voltage.

[0007]

[Problems that the Invention is to Solve]

However, in such head drive for the inkjet printer, the drive signal applied to each piezoelectric element, which signal is a DC signal, is configured to be set to a high voltage during non-drive and have the voltage lowered during drive. In this case, power consumption becomes large and a voltage applied to the piezoelectric element becomes comparatively high. Therefore, a voltage drop due to the aforesaid discharging is also large, so that a power loss is large.

[0008]

Besides, when an increase in density of print dots is intended to be realized for an improvement in print quality, the gap between the electrodes of

the piezoelectric elements adjacent to each other is narrowed. However, in case where the driven piezoelectric element and the non-driven piezoelectric element are adjacent to each other, when voltage between the electrodes of these piezoelectric elements is raised, in some cases, discharge occurs between the electrodes of these piezoelectric elements.

[0009]

Furthermore, each piezoelectric element is reduced in size due to the increase in density and thus reduced in withstanding pressure. Therefore, when the increase in density further proceeds, the maximum voltage of the drive signal exceeds the withstanding pressure of the piezoelectric element, so that there is the possibility that the piezoelectric element will not operate normally.

[0010]

Consequently, insulating such as filling of an insulation material will be needed between the electrodes of the piezoelectric elements.

[0011]

On the contrary, there is also a head drive method such that the ground side of each piezoelectric element is held at the intermediate potential of the drive signal. According to such a head drive method, it is possible to prevent the discharge between the electrodes of the piezoelectric elements that occurs upon the aforesaid increase in density. However, in correspondence to variation in the drive signal, the voltage need be varied and charging and discharging need be switched, so that a bi-directional variable power supply will be needed.

[0012]

Furthermore, such a power supply utilizes a so-called logic power supply in a control section of a printer body. Thus, a circuit configuration will be complicated and a cost will be increased.

[0013]

Besides, when such a voltage drop as aforesaid occurs, if the charge voltage is rapidly applied to the piezoelectric element, the piezoelectric element will be driven in some cases. Thus, there is the possibility that a malfunction will occur, i.e., an ink droplet will be erroneously ejected. Accordingly, when a drive waveform COM is determined, it is necessary to consider the timing of feeding a charge signal, thus constraining the determination of the drive waveform.

[0014]

Consequently, an object of the invention is to provide a head drive apparatus and method, for an inkjet printer, configured to reduce the voltage drop due to discharge of each piezoelectric element while eliminating the occurrence of malfunction of each piezoelectric element, with a simple configuration.

[0015]

[Means for Solving the Problems]

To solve the aforesaid problems, in the invention, a bias power supply circuit utilizing a head drive power supply applies a bias voltage to a ground-side electrode of each piezoelectric element, thus holding the ground side of each piezoelectric element at a bias potential higher than a ground potential.

[0016]

That is, in the head drive apparatus for an inkjet printer according to claim 1, in which a piezoelectric element, for pressurizing ink, provided to correspond to each of plural nozzles is selectively driven with a predetermined print timing by a drive signal from a head drive circuit, thus ejecting an ink droplet through the corresponding nozzle to perform printing, the head drive apparatus for an inkjet printer is characterized by comprising a bias power supply circuit for applying a predetermined bias voltage to a ground-side electrode of each piezoelectric element; and in that the aforesaid bias power supply circuit generates the bias voltage utilizing a head drive power supply.

[0017]

Besides, in a head drive method for an inkjet printer according to claim 7, in which a piezoelectric element, for pressurizing ink, provided to correspond to each of plural nozzles is selectively driven with a predetermined print timing by a drive signal from a head drive circuit, thus ejecting an ink droplet through the corresponding nozzle to perform printing, the head drive method for an inkjet printer is characterized by comprising a bias power supply circuit for generating the bias voltage utilizing a head drive power supply applies a predetermined bias voltage to a ground-side electrode of each piezoelectric element.

[0018]

According to this configuration, the bias voltage supplied by the bias power supply circuit utilizing the head drive power supply is applied to the ground-side electrode of the piezoelectric element. Thereby, the ground side is held at the bias voltage.

[0019]

Besides, even if natural discharge of the piezoelectric element occurs, the bias power supply circuit always applies the predetermined bias voltage to the ground-side electrode of the piezoelectric element, thus reducing a leakage current caused upon occurrence of the natural discharge and reducing the voltage drop. Therefore, rapid variation in voltage caused upon application of the charge voltage against the voltage drop due to discharge of the piezoelectric element, such as is conventional, is reduced. Thus, the occurrence of malfunction of the piezoelectric element can be eliminated. At the same time, when a drive waveform COM is determined, it is not necessary to consider the timing of feeding a charge signal, so that the determination of the drive waveform will no longer be constrained.

[0020]

The head drive apparatus according to claim 2 is characterized in that the aforesaid bias power supply circuit includes a capacitor connected to the ground-side electrode of each piezoelectric element and a constant voltage circuit for applying the bias voltage to the aforesaid capacitor utilizing the head drive power supply.

[0021]

The head drive method according to claim 6 is characterized in that the aforesaid bias power supply circuit includes a capacitor connected to the ground-side electrode of each piezoelectric element and a constant voltage circuit for applying the bias voltage to the aforesaid capacitor utilizing the head drive power supply.

[0022]

According to this configuration, the capacitor connected to the

ground-side electrode of the piezoelectric element is charged using the bias voltage from the constant voltage circuit. Therefore, the ground-side electrode of the piezoelectric element is held at the bias voltage from the capacitor.

[0023]

The head drive apparatus according to claim 3 is characterized in that the aforesaid constant voltage circuit includes a Zener diode connected to the head drive power supply via a current limiting resistor, and the voltage of the Zener diode is applied as the bias voltage to the capacitor via a coupling element.

[0024]

The head drive method according to claim 7 is characterized in that the aforesaid constant voltage circuit includes a Zener diode connected to the head drive power supply via a current limiting resistor, and the voltage of the Zener diode is applied as the bias voltage to the capacitor via a coupling element.

[0025]

According to this configuration, the capacitor connected to the ground-side electrode of the piezoelectric element is charged, via the coupling element, using the voltage of the Zener diode of the constant voltage circuit. Thereby, the capacitor is charged using the stable bias voltage. At the same time, the coupling element prevents the discharge from the ground-side electrode of the piezoelectric element from flowing to the Zener diode.

[0026]

The head drive apparatus according to claim 4 is characterized in that the aforesaid constant voltage circuit includes a discharging diode connected

in parallel to the current limiting resistor so as to cause a current to flow to the head drive power supply side.

[0027]

The head drive method according to claim 8 is characterized in that the aforesaid constant voltage circuit includes a discharging diode connected in parallel to the current limiting resistor so as to cause a current to flow to the head drive power supply side.

[0028]

According to this configuration, when the voltage of the head drive power supply lowers to 0 V due to power off or the like, electric charge charged in the capacitor bypasses the current limiting resistor and is thereby discharged via the discharging diode. Thereby, the capacitor can be discharged for a short time period.

[0029]

[Mode for Carrying out the Invention]

A head drive apparatus according to embodiments of the invention will be described with reference to the drawings. Additionally, since the embodiments to be described below are preferred embodiments of the invention, various technically preferable limitations are put thereon. However, the scope of the invention is not limited to these embodiments unless the following description specifically states any limitation on the invention. Fig. 1 shows the configuration of an embodiment of the head drive apparatus according to the invention.

[0030]

In Fig. 1, the head drive apparatus 10 comprises: a piezoelectric

element 11 provided to correspond to each of plural nozzles of an inkjet printer; a head drive circuit 12 for supplying a drive signal to one-side electrode 11a of each piezoelectric element 11; a current amplifying circuit 13 and a switch circuit 14 that are provided between this head drive circuit 12 and each piezoelectric element 11; and a bias power supply circuit 20 for applying a predetermined bias voltage to the other, ground-side electrode 11b of each piezoelectric element 11.

[0031]

Here, Fig. 1 shows only one piezoelectric element 11. However, actually, a head of the inkjet printer is provided with plural nozzles and one piezoelectric element is provided to correspond to each nozzle. And, the drive signal COM from the head drive circuit 12 is sequentially outputted to each piezoelectric element 11, actually via a shift register or the like.

[0032]

The piezoelectric element 11, which is a piezo-element for example, is configured to be displaced by a voltage applied between both electrodes 11a and 11b. And, the piezoelectric element 11 is charged in the vicinity of an intermediate potential V0. When discharged based on the drive signal COM from the head drive circuit 12, the piezoelectric element 11 is configured to pressurize ink in the corresponding nozzle to thereby eject an ink droplet through this nozzle.

[0033]

The head drive circuit 12, configured as a driver IC, generates the drive signal COM for the head of the inkjet printer and is disposed, for example, in a printer body.

[0034]

The current amplifying circuit 13 comprises two transistors: a first transistor 15 and a second transistor 16. The first transistor 15 has a collector connected to a constant voltage power supply 17, a base connected to the output of the head drive circuit 12, and an emitter connected to the input side of the switch circuit 14. Thereby, electrical conduction is established based on a signal from the head drive circuit 12, thus supplying a constant voltage to the piezoelectric element 11 via the switch circuit 14. Here, the aforesaid constant voltage power supply is a comparatively high-voltage power supply for supplying a head drive voltage of DC 42 V for example.

[0035]

Besides, the second transistor 16 has an emitter connected to the input side of the switch circuit 14, a base connected to the output of the head drive circuit 12, and a collector connected to ground. Thereby, electrical conduction is established based on a signal from the head drive circuit 12, thus discharging the piezoelectric element 11 via the switch circuit 14 and bleeding the discharged electric charge to ground.

[0036]

The switch circuit 14 is an analog switch circuit. Upon receipt of a control signal, the switch circuit 14 is turned on with the drive timing of the corresponding piezoelectric element 11, thus outputting the drive signal COM to the piezoelectric element 11. Here, the aforesaid piezoelectric element 11 and the switch circuit 14 are provided in the head of the printer and connected thereto via a flexible flat cable 18.

[0037]

As shown in Fig. 1, the aforesaid bias power supply circuit 20 comprises a capacitor 21 and a constant voltage circuit 22. Thereby, the bias power supply circuit 20 is intended to utilize a constant voltage power supply 17 acting as a head drive power supply to thereby apply a predetermined voltage to the other, ground-side common electrode 11b of the piezoelectric element 11. The predetermined voltage is a predetermined bias voltage Vb equal to or lower than an intermediate potential V0 based on the drive signal COM, of the piezoelectric element 11.

[0038]

The aforesaid capacitor 21, which is an electrolytic capacitor, has one end connected to the ground-side common electrode 11b of the piezoelectric element and the other end connected to ground. Thereby, the capacitor 21 is intended to apply its charge voltage to the ground-side electrode 11b of each piezoelectric element 11.

[0039]

Additionally, the capacity of the capacitor 21 is selected to be sufficiently greater than the total capacitance (about several μF) of all the electrostatic elements 11, for example, about several thousands μF, in order that the stable bias voltage Vb can be supplied to each piezoelectric element 11.

[0040]

The aforesaid constant voltage circuit 22 comprises a current limiting resistor 23, a Zener diode 24, a coupling resistor 25 acting as a coupling element, an anti-noise capacitor 26, and a discharging diode 27. Thereby, the constant voltage circuit 22 is intended to generate the bias voltage Vb utilizing

the constant voltage power supply 17 acting as the aforesaid head drive power supply.

[0041]

The current limiting resistor 23 and Zener diode 24 are connected in series to each other between the aforesaid constant voltage power supply 17 and the ground. The voltage of the Zener diode 24 (the voltage on the opposite side to the ground of the Zener diode 24) is held at a predeterrmined voltage, for example, DC 6 V. Here, the current limiting resistor 23 uses one having a resistance of about several kΩ.

[0042]

The aforesaid coupling resistor 25 is intended to divide a circuit so that the voltage of the Zener diode 24 is applied to the capacitor 21 and the charge voltage of the capacitor 21 is not applied to the Zener diode 24. The coupling resistor 25 uses one having a resistance of about several tens Ω to several kΩ for example.

[0043]

The aforesaid anti-noise capacitor 26 is intended to absorb and remove a noise component included in the voltage of the Zener diode 24, and may be omitted.

[0044]

The aforesaid discharging diode 27 is intended such that when its voltage lowers to 0 V due to power off of the constant voltage power supply 17 or the like, electric charge charged in the capacitor 21 bypasses the current limiting resistor 23 and is thereby rapidly discharged. The discharging diode 27 may similarly be omitted.

[0045]

The head drive apparatus 10 according to this embodiment is configured as aforesaid and operates as follows based on the head drive method according to the invention. The piezoelectric element 11 driven during printing will first be described. At the time of print start (START) of the inkjet printer, as shown in Fig. 2A, a charge signal NCHG is inverted to an L level for a time period of 100 μs for example. Thereby, the potential of the drive signal COM from the head drive circuit 12 is raised to an intermediate potential Vc.

[0046]

Thereby, the drive signal COM causes a current to flow from the first transistor 15 of the current amplifying circuit 13 via the switch circuit 14 to the one-side electrode 11a of each piezoelectric element 11, thus charging the one-side electrode 11a of each piezoelectric element 11. Thereby, the potential of the one-side electrode 11a of the piezoelectric element 11 is raised to the intermediate potential Vc, as shown in solid line in Fig. 2B.

[0047]

At this time, the charge voltage of the capacitor 21 of the bias voltage power supply 20 is applied, as the bias voltage Vb, to the other, ground-side common electrode 11b of each piezoelectric element 11. Thereby, the other, ground-side common electrode 11b is held at the predetermined voltage Vb, as shown in dotted line in Fig. 2B.

[0048]

Here, the potential of the ground-side electrode 11b of the piezoelectric element 11 is held at the predetermined voltage Vb. Therefore, the potential difference between both electrodes 11a and 11b of the

piezoelectric element 11 is Vb at the time of print start. However, this potential difference Vb is lower than the intermediate potential Vc of the drive signal COM. Thus, the piezoelectric element 11 will not malfunction ejecting an ink droplet.

[0049]

Then, during printing, based on variation in the drive signal COM, when the potential of the drive signal COM is higher than the intermediate potential Vc, the one-side electrode 11a of the piezoelectric element 11 is charged via the first transistor 15 of the current amplifying current 13. Besides, when the potential of the drive signal COM is lower than the intermediate potential Vc, the one-side electrode 11a of the piezoelectric element 11 is discharged via the second transistor 16 of the current amplifying circuit 13. Thereby, the piezoelectric element 11 operates based on the drive signal COM, thus ejecting an ink droplet.

[0050]

Here, as shown by reference character X in Fig. 2B, the voltage of the piezoelectric element 11 drops halfway due to self-discharge, so that the potential of the one-side electrode 11a of the piezoelectric element 11 becomes lower than the intermediate potential Vc. To prevent such a phenomenon, as shown by reference character Y in Fig. 3C, the charge signal NCHG generates L level pulses at regular cycles of the drive signal COM, i.e., with a timing such that there appears no variation in the drive signal COM.

[0051]

Thereby, based on the drive signal COM from the head drive circuit 12, the one-side electrode 11a of the piezoelectric element 11 is charged via

the first transistor 15 of the current amplifying circuit 13. Thus, even the non-driven piezoelectric element 11 is held at the intermediate potential Vc. Additionally, at this time, the voltage drop due to natural discharge of the piezoelectric element 11 is already reduced. Therefore, rapid charging of the piezoelectric element 11 by the charge signal NCHG is avoided, so that malfunction of the piezoelectric element 11 will not occur.

[0052]

On the contrary, the bias power supply circuit 20 applies the bias voltage Vb to the other, ground-side common electrode 11b of each piezoelectric element 11. Thereby, the other, ground-side common electrode 11b is held at this voltage. Accordingly, the potential difference between both electrodes 11a and 11b of each piezoelectric element 11 becomes (Vc-Vb).

[0053]

Furthermore, at the time of print end (END), as shown in Fig. 2A, the drive signal COM from the head drive circuit 12 is discharged from the one-side electrode 11a of the piezoelectric element 11 via the second transistor 16 of the current amplifying circuit 13. Thereby, the potential of the drive signal COM is lowered to a potential of zero. On the contrary, the one-side electrode 11a of the non-driven piezoelectric element 11 is always charged to and held at the intermediate potential by the drive signal COM from the head drive circuit 12.

[0054]

Thus, the potential of the ground-side electrode 11b of each piezoelectric element 11 is held at the constant voltage Vb by the bias voltage Vb from the bias voltage circuit 20. Therefore, the potential difference between

both electrodes 11a and 11b of the piezoelectric element 11 is held small. At the same time, when the driven piezoelectric element and the non-driven piezoelectric element are adjacent to each other, the potential difference between the one-side electrodes 11a of these piezoelectric elements is also held small. Accordingly, power consumption of the piezoelectric element 11 is reduced, and the voltage drop due to self-discharge of the piezoelectric element 11 is small, thus reducing a power loss.

[0055]

Besides, the potential difference between the driven piezoelectric element 11 and the non-driven piezoelectric element 11 becomes small. Therefore, even when such piezoelectric elements 11 are adjacent to each other, the occurrence of discharge between the piezoelectric elements 11 is reduced. At the same time, even when the withstanding pressure of the individual piezoelectric elements 11 is reduced due to an increase in density, there is no need to perform insulating between the piezoelectric elements 11. Therefore, the increase in density of the head can be easily realized.

[0056]

Furthermore, when the voltage of the constant voltage power supply 17 lowers to 0 V due to power off or the like, the capacitor 21 of the bias power supply circuit 20 need be discharged. However, electric charge charged in the capacitor 21 bypasses the current limiting resistor 23 of the constant voltage circuit 22 and is thereby discharged via the discharging diode 27. Therefore, the capacitor 21 is discharged for a short time period.

[0057]

Besides, the bias power supply circuit 20 generates the bias voltage

Vb utilizing the constant voltage power supply 17 acting as the head drive power supply. Accordingly, there is no need of a power supply circuit of complicated configuration such as is conventional, for example, utilizing a logic power supply. Thus, the bias power supply circuit 20 itself comprises the capacitor 21 and the constant voltage circuit 22 including, for example, the current limiting resistor 23, the Zener diode 24, and the coupling resistor 25 acting as a coupling element. Therefore, the bias power supply circuit 20 can be obtained at a low cost. Thus, the total cost of the head drive apparatus 10 can be reduced.

[0058]

In the aforesaid embodiment, the piezoelectric element 11 uses a piezo-element for example but is not limited thereto. Alternatively, another piezoelectric element such for example as an electrostriction element or a magneto-striction element may be used.

[0059]

Besides, in the aforesaid embodiment, the coupling element of the bias power supply circuit 20 uses the coupling resistor 25 but is not limited thereto. It is apparent that a coupling element such for example as a coil may be used.

[0060]

[Advantage of the Invention]

As described above, according to the invention, the bias voltage supplied from the bias power supply circuit utilizing the head drive power supply is applied to the ground-side electrode of the piezoelectric element. Thereby, the ground side of the piezoelectric element is held at the bias

voltage. Accordingly, the voltage applied between both electrodes of the piezoelectric element becomes comparatively low. Thus, power consumption is reduced and a power loss is reduced.

[0061]

Besides, even if natural discharge of the piezoelectric element occurs, the bias power supply circuit always applies the predetermined bias voltage to the ground-side electrode of the piezoelectric element, thus reducing a leakage current caused upon occurrence of the natural discharge and reducing the voltage drop. Therefore, rapid variation in voltage caused upon application of the charge voltage against the voltage drop due to discharge of the piezoelectric element, such as is conventional, is reduced. Thus, the occurrence of malfunction of the piezoelectric element can be eliminated.

[Brief Description of the Drawings]

[Fig. 1]

A block diagram showing the configuration of an embodiment of a head drive apparatus according to the invention; and

[Fig. 2]

A timing diagram showing variations in (A) a drive signal, (B) the voltages of both electrodes of a piezoelectric element, and (C) a charge signal in the head drive apparatus of Fig. 1.

[Description of the Reference Numerals and Signs]

10: Head drive apparatus

11: Piezoelectric element

11a: One-side electrode

11b: Ground-side electrode

12: Head drive circuit

13: Current amplifying circuit

14: Switch circuit

15: First transistor

16: Second transistor

17: Constant voltage power supply (Head drive power supply)

18: Flexible flat cable

20: Bias power supply circuit

21: Capacitor

22: Constant voltage circuit

23: Current limiting resistor

24: Zener diode

25: Coupling resistor

26: Anti-noise capacitor

27: Discharging diode

[Designation of Document] ABSTRACT

[Abstract]

[Problem] An object of the invention is to provide a head drive apparatus and method, for an inkjet printer, configured to reduce the voltage drop due to discharge of each piezoelectric element while eliminating the occurrence of malfunction of each piezoelectric element, with a simple configuration.

[Means for Resolution] In a head drive apparatus 10, for an inkjet printer, in which a piezoelectric element 11 for pressurizing ink provided to correspond to each of plural nozzles is selectively driven with a predetermined print timing by a drive signal COM from a head drive circuit 12, thus ejecting an ink droplet through the corresponding nozzle to perform printing, the head drive apparatus 10 for an inkjet printer is configured to comprise a bias power supply circuit 20 for applying a predetermined bias voltage Vb to a ground-side electrode of each piezoelectric element, and such that the aforesaid bias power supply circuit 20 generates the bias voltage Vb utilizing a head drive power supply 17.

[Selected Drawing] Fig. 1

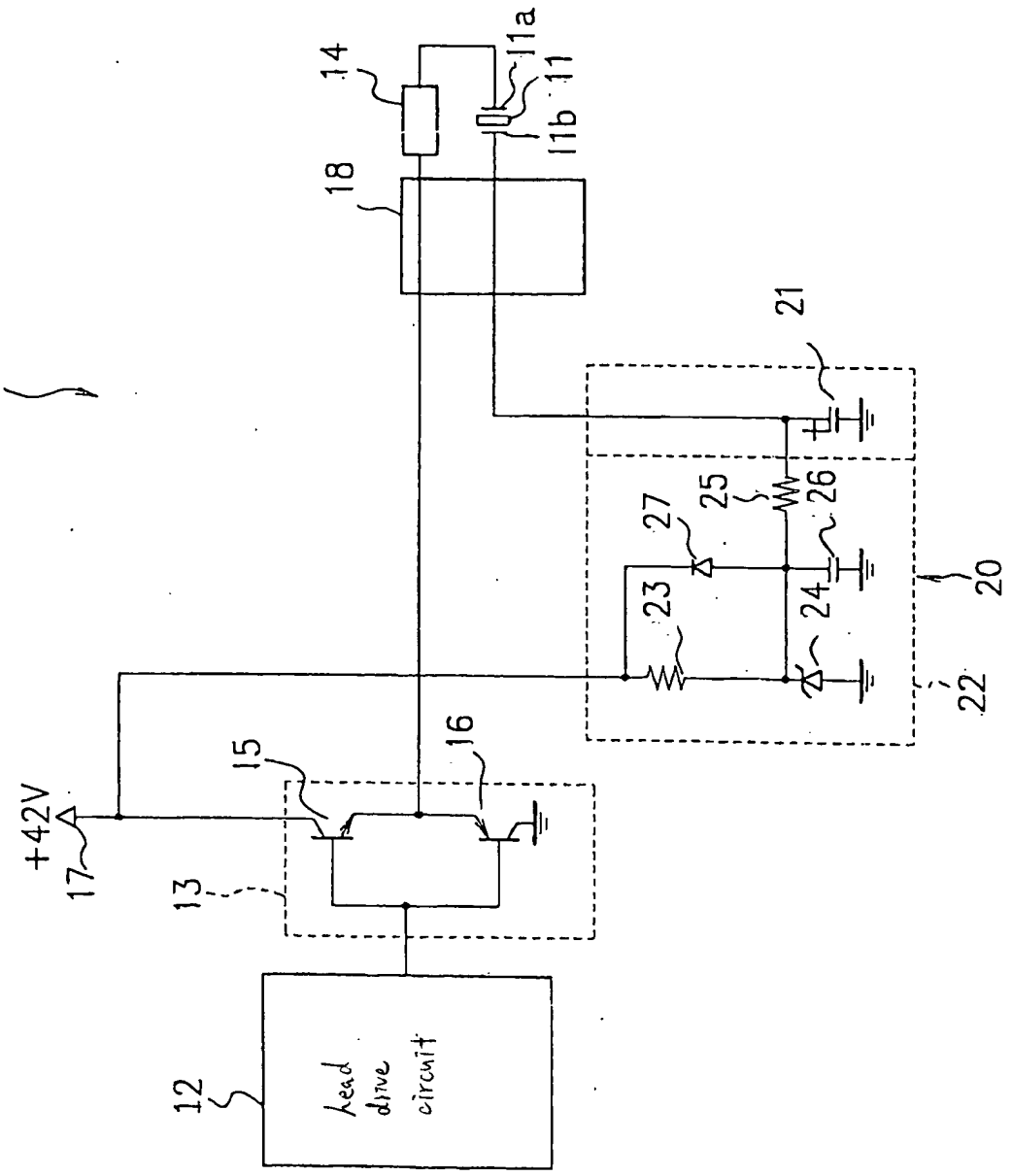

Fig. 1

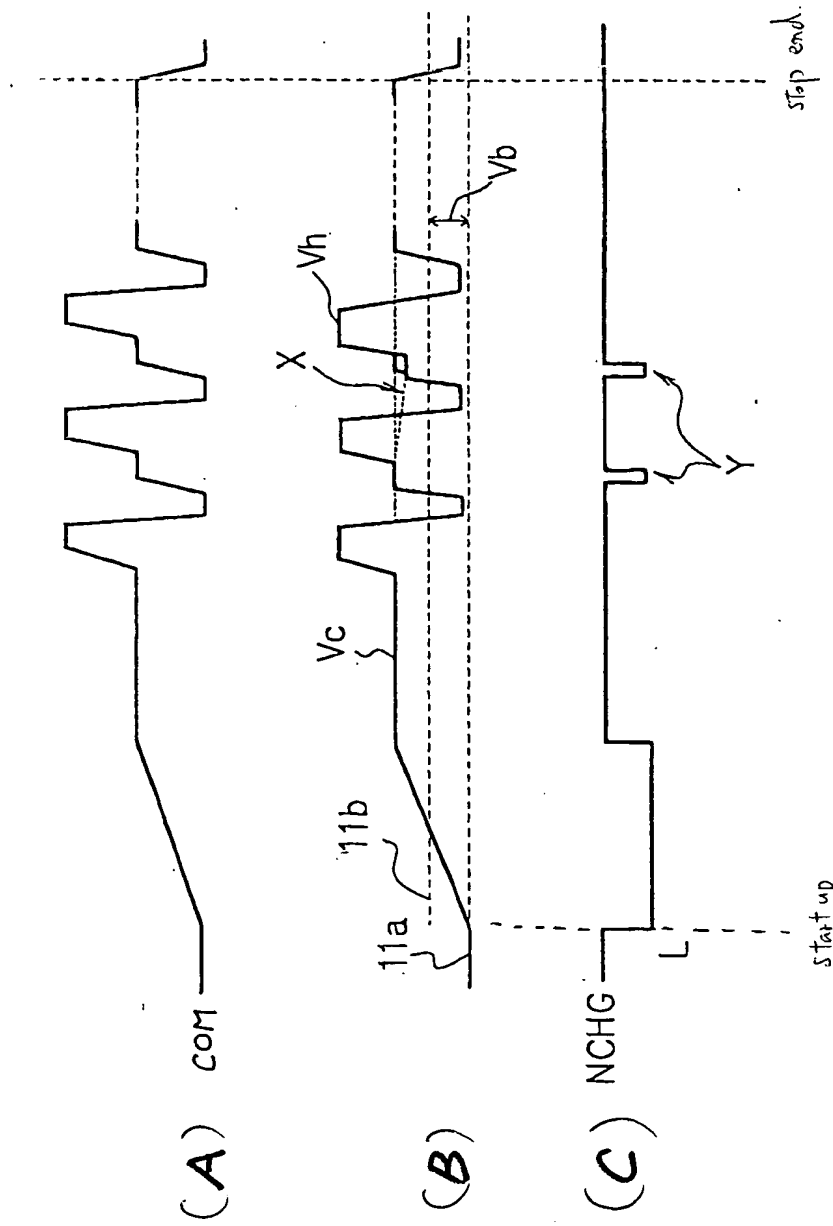

Fig. 2